CLAIMS

What is claimed is:

1. A method for handling image data, the method comprising:

decomposing the image data into a plurality of data sets using lossless wavelet decomposition;

tessellating at least one decomposed set of the plurality of data sets into a plurality of blocks;

compressing each tessellated block of the plurality of blocks using lossless compression; and

compiling a data stream comprising the compressed plurality of blocks arranged sequentially in a desired order based upon the decomposition and tessellation.

2. The method of claim 1, wherein the lossless wavelet decomposition comprises lossless integer wavelet decomposition.

3. The method of claim 1,wherein tessellating comprises using a fixed block size for the plurality of blocks.

4. The method of claim 1, wherein tessellating comprises addressing each tessellated block with a tessellation index for each dimension of tessellation.

5. The method of claim 4, wherein addressing comprises providing a decomposition level index for identifying a desired set of the plurality of data sets.

6. The method of claim 1, further comprising selectively transmitting at least a portion of the data stream.

7. The method of claim 6, wherein selectively transmitting comprises selecting the portion based upon a desired set of the plurality of data sets and a desired group of the plurality of blocks encompassing a region of interest.

8. The method of claim 7, wherein selecting the portion comprises identifying the desired set and each tessellated block of the desired group using an addressable function.

9. The method of claim 1, wherein the data stream comprises a header, which comprises characteristics of the decomposition, the tessellation, and the compression.

10. The method of claim 1, wherein the data stream comprises a resolution level index for each decomposed set, a tessellation row index for each tessellated block, and a tessellation column index for each tessellated block.

11. The method of claim 1, wherein the desired order comprises an order of desired blocks of the tessellated blocks.

12. The method of claim 1, further comprising storing the data stream based on indices to the decompositions and tessellations.

13. The method of claim 12, wherein storing the data stream comprises storing each of the compressed plurality of blocks in data groups based on the indices.

14. The method of claim 1, wherein the plurality of data sets correspond to a plurality of resolution levels.

15. The method of claim 1, wherein decomposing the image data using lossless wavelet decomposition comprises creating a hierarchical set of sub-bands, one set comprising a low frequency component at a lowest resolution level and remaining sets comprising high frequency components at successively higher resolution levels.

16. The method of claim 15, wherein compressing each tessellated block comprises compressing the high-frequency components using actual values, and further comprising compressing the low frequency component at the lowest resolution level using prediction errors.

17. The method of claim 1, wherein compressing comprises dividing each tessellated block into subregions to be individually compressed based upon an entropy of each subregion.

18. The method of claim 1, comprising reconstructing an image at least partially from the tessellated blocks.

19. A method for retrieving image data, the method comprising:

identifying data according to a decomposition level index and tessellation block indices, wherein the decomposition level index refers to data sets generated from an image by lossless wavelet decomposition, and the tessellation block indices refer to blocks tessellated from the data sets; and

transmitting a data stream of the data identified by the decomposition level index and the tessellation block indices, wherein the data stream is ordered based upon the decomposition level index and the tessellation block indices.

20. The method of claim 19, wherein the decomposition level index corresponds to a resolution level.

21. The method of claim 19, comprising a plurality of the decomposition level indices.

22. The method of claim 19, wherein the tessellation block indices comprise a row index and a column index for addressing spatial coordinates of the blocks.

23. The method of claim 22, wherein the data stream is ordered based upon the spatial coordinates of the blocks.

24. The method of claim 19, wherein transmitting the data stream comprises transmitting at least part of a desired one of the data sets identified by the decomposition level index, the desired one corresponding to an image resolution relatively higher than a locally stored one of the data sets.

25. The method of claim 24, wherein transmitting the data stream comprises transmitting specific addressable groups of the blocks for the desired one.

26. The method of claim 19, wherein the lossless wavelet decomposition comprises lossless integer wavelet decomposition.

27. The method of claim 19, wherein the blocks tessellated from the data sets have a fixed block size.

28. The method of claim 19, wherein the data stream comprises data block sets, each comprising tessellated sub-band data at one index set of the decomposition level index and the tessellation block indices.

29. The method of claim 19, wherein the data stream comprises an addressable data block comprising a plurality of data blocks identified by the decomposition level index and the tessellation block indices.

30. The method of claim 19, wherein transmitting comprises transmitting over a network.

31. A method for handling image data, the method comprising:

decomposing the image data into a plurality of resolution levels using lossless wavelet decomposition;

tessellating at least part of one level of the plurality of resolution levels into a plurality of blocks;

compressing tessellated data for the at least part using lossless compression; and

storing the tessellated and compressed data by referencing the plurality of resolution levels and the plurality of blocks.

32. The method of claim 31, wherein the lossless wavelet decomposition comprises lossless integer wavelet decomposition.

33. The method of claim 31, wherein the plurality of resolution levels comprise a lowest resolution level having a low frequency component and a remaining plurality of resolution levels comprising high frequency components..

34. The method of claim 33, wherein tessellating at least part of one level comprises tessellating only the high frequency components.

35. The method of claim 33, wherein compressing comprises compressing the high frequency components using actual values and compressing the low frequency component of the lowest resolution level using prediction error values.

36. The method of claim 31, further comprising accessing portions of the image data by addressing the tessellated and compressed data based on indices for the plurality of resolution levels and the plurality of blocks.

37. The method of claim 31, wherein storing the tessellated and compressed data comprises addressably storing the tessellated and compressed data based on a decomposition level index for the plurality of resolution levels and tessellation block indices for the plurality of blocks.

38. A method of storing image data, the method comprising:

decomposing the image data into a plurality of resolution levels using lossless integer wavelet decomposition;

tessellating at least part of each decomposed level of the plurality of resolution levels into a plurality of spatial blocks; and

storing data for the plurality of spatial blocks as a plurality of addressable data blocks comprising indices for the resolution levels and spatial image blocks.

39. The method of claim 38, wherein the plurality of resolution levels comprise a lowest resolution level and a remaining plurality of resolution levels.

40. The method of claim 39, wherein the plurality of resolution levels comprise a lowest resolution level having a low frequency component and a remaining plurality of resolution levels comprising high frequency components.

41. The method of claim 40, wherein tessellating at least part of each decomposed level comprises tessellating the high frequency components.

42. The method of claim 38, wherein the plurality of spatial blocks have a fixed block size.

43. The method of claim 38, wherein storing comprises ordering the plurality of addressable data blocks based on the indices.

44. The method claim 43, wherein storing comprises forming a data string of the plurality of addressable data blocks.

45. The method of claim 44, wherein forming the data stream comprises providing a header having decomposition statistics and tessellation statistics for the plurality of addressable data blocks.

46. The method of claim 38, wherein storing comprises compressing each of the plurality of addressable data blocks.

47. The method of claim 46, wherein compressing comprises compressing high frequency components of each of the plurality of resolution levels based upon actual values and compressing a low frequency component of a lowest resolution level of the plurality of resolution levels based upon prediction error values.

48. The method of claim 38, further comprising accessing a desired portion of the plurality of spatial blocks based on the indices of the addressable data blocks.

49. A system comprising:

an interface comprising:

a decomposition module configured for decomposing image data using lossless wavelet decomposition to produce a plurality of data sets corresponding to a plurality of resolution levels ranging from a lowest resolution level to a highest resolution level;

a tessellation module configured for tessellating desired portions of the plurality of data sets into a plurality of spatial blocks; and

an addressing module configured for indexing the desired portions into a plurality of addressable data blocks based on the resolution levels and coordinates of the spatial blocks; and

a memory device configured to store the plurality of addressable data blocks.

50. The system of claim 49, wherein the interface comprises a compression module configured for compressing each of the addressable data blocks.

51. The system of claim 49, wherein the interface comprises a storage control module configured for storing each of the addressable data blocks individually on the memory device.

52. The system of claim 51, wherein the image storage module comprises an ordering module configured for storing the addressable data blocks based on the coordinates of the spatial blocks and the resolution level.

53. The system of claim 49, wherein the interface comprises a transmission module configured for transmitting a desired spatial portion and resolution level of the image data based on indices of the addressable data blocks, the indices comprising a resolution level index and at least two coordinate indices for the spatial blocks.

54. The system of claim 49, wherein the system comprises a picture archiving and communication system.

55. The system of claim 49, further comprising one or more imaging systems.

56. The system of claim 55, wherein the one or more imaging systems comprise an MRI system.

57. The system of claim 55, wherein the one or more imaging systems comprise a computed tomography system.

58. The system of claim 55, wherein the one or more imaging systems comprise a positron emission tomography system.

59. The system of claim 55, wherein the one or more imaging systems comprise a radio fluoroscopy system.

60. The system of claim 55, wherein the one or more imaging systems comprise a computed radiography system.

61. The system of claim 55, wherein the one or more imaging systems comprise an ultrasound system.

62. The system of claim 49, wherein the lossless wavelet decomposition comprises lossless integer wavelet decomposition.

63. A computer program comprising:

a machine readable medium; and

an image handling module stored on the machine readable medium, comprising:

an image decomposition module configured for decomposing image data using lossless wavelet decomposition to produce a plurality of data sets corresponding to a plurality of resolution levels ranging from a lowest resolution level to a highest resolution level; and

a tessellation module configured for tessellating desired portions of the plurality of data sets into a plurality of spatial blocks.

64. The computer program of claim 63, wherein the image handling module comprises an addressing module configured for indexing the desired portions into a plurality of addressable data blocks based on the resolution levels and coordinates of the spatial blocks.

65. The computer program of claim 64, wherein the image handling module comprises a compression module configured for compressing each of the addressable data blocks.

66. The computer program of claim 64, wherein the image handling module comprises a storage control module configured for storing each of the addressable data blocks individually on the machine readable medium.

67. The computer program of claim 64, wherein the image handling module comprises an access module configured for providing access to a desired spatial portion and resolution level of the image data based on indices of the addressable data blocks, the indices comprising a resolution level index and at least two coordinate indices for the spatial blocks.

68. The computer program of claim 67, wherein the access module comprises an ordering module configured for transferring the addressable data based on the indices.

69. The computer program of claim 63, wherein the lossless wavelet decomposition comprises lossless integer wavelet decomposition.

70. The computer program of claim 63, wherein the plurality of data sets comprise a lowest resolution data set having a low frequency component and a remaining plurality of data sets comprising high frequency components.